DIGITAL MULTIMETER

Knight

MODEL K-3000

OPERATING MANUAL

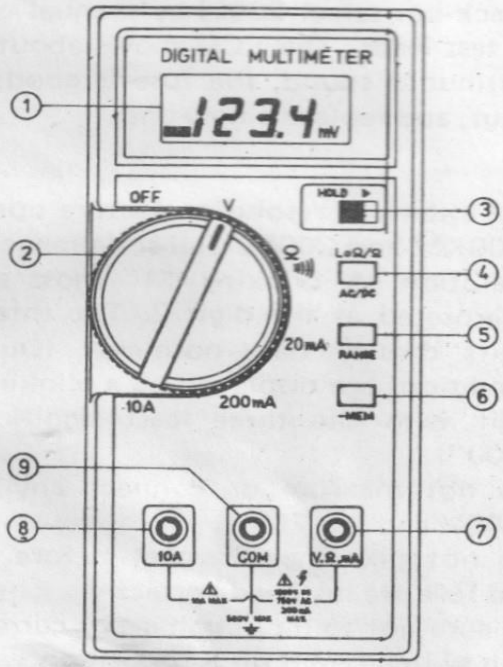
AUTO-RANGING DIGITAL MULTIMETER

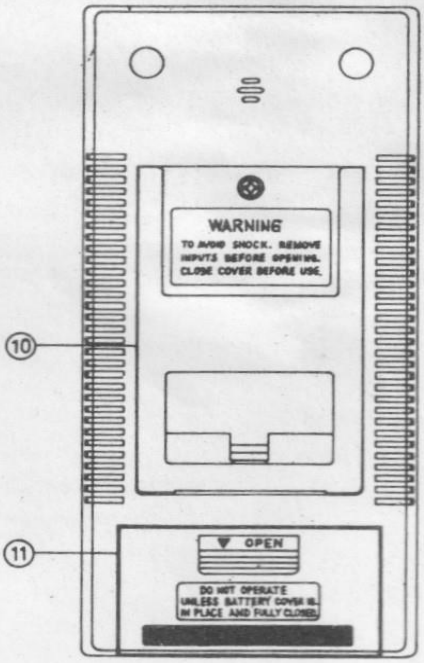
I. Introduction

The auto-ranging digital multimeter is precise and multi-functional. With a simple range rotary selector in tune with a auto-ranging switch, it can be easily operated in any place.

II. Features and positions:

1. LCD: 3½ digit, maximum auto-ranging value 2000, maximum manual ranging value 3000; shows units, decimal, low battery, etc.
2. Range rotary selector:
   For power opening and selection of desired voltage range, current range of 20mA, 200mA, 10A and resistance Ω.
3. Hold switch:
   For holding values in the dark or inconvenient places and the "HOLD" mark to be showed. (but 10A function no show).
4. DC/AC, Ω/LowΩ touch selector:
   For selection of DC or AC, Ω or LowΩ (low power resistance test could be done on circuits without resulting to diode or transistor conduction).
5. Range touch selector:
   Press it once, and it will switch from auto-range to manual-range. Press again, and each time it will show different range. (When measuring function changes, it will revert to auto-range.)
6. Memory (—MEM) touch switch:
   To store first input value (10% of full scale value, that is maximum storing number 99) and compare with next inputed one (to substract each other). It is most convenient for the substraction of wire impedance to obtain accurate value.


DIGITAL MULTIMETER
123.4 mV
OFF
V
Ω
20mA
200mA
10A
HOLD
Lo Ω/Ω
AC/DC
RANGE
MEM
10A
COM
V.Ω.mA
1
2
3
4
5
6
7
8
9


WARNING
TO AVOID SHOCK, REMOVE INPUTS BEFORE OPENING. CLOSE COVER BEFORE USE.
OPEN
DO NOT OPERATE UNLESS BATTERY COVER IS IN PLACE AND FULLY CLOSED.
10
11

7. Voltage/resistance/current (V.Ω. mA) measuring jack:
   To connect positive lead for voltage, resistance, and current measurement.
8. Current 10A jack:
   To connect positive lead for measuring AC or DC currnet above 200 mA or below 10A.
9. Common (COM) jack:
   To connect negative lead for every kinds of measurement.
10. Handy stand:
    Handy stand for adjusting the best sight vision.
11. Battery cover:
    Push it downward to replace new battery or fuse.
12. Auto-low battery display:
    When battery's power is consumed to 7V approximately, LCD will show low battery (⊟) automatically, and the battery needs to be replaced to assure accuracy.
13. Auto-buzz indication:
    When measure resistance, counting unit under 19 will lead to a continuous 4KHz sound; this is also available for short-cut measurement of OHM.
    In overload of voltage and current measurement, it will sound discontinuously; LCD will show "1" flashing in highest position and the rest is "000".
    When range of auto or manual-ranging selector changes, it will sound for 0.015 second (15 ms) (There will be no sound change current range).

III. General specification:

LCD: 3½ dgt. maximum ±1999; low battery, functions (—MEM, AUTO, HOLD, LOWΩ, AC) and units (K, Ω, m, V, A) indication.
Operating temperature & humidity: 0°C-50°C, below 80% RH.
Storage temperature & humidity: —10°C-60°C, below 80% RH.
Power: battery 006P, 9V.
Battery Life: 200H approx.
Size and weight: 170x80x33 m/m, 265g (including battery) approx.
Accessories: Operator's manual, spare fuse (0.5A, 250V, 5.2ϕx20m/m), test leads.

IV. Electrical specification:

Functions	Ranges	Resolution	Accuracy		Input impedance	Overload protection
Direct Current Voltage (DC V) (Auto-manu)	200.0mV	100μV	±(0.5%rdg + 2dgt)		100MΩ	DC 1000V AC 750Vrms
	2.000V	1mV	±(0.5%rdg + 2dgt)		11MΩ	
	20.00V	10mV	±(0.5%rdg + 2dgt)		10MΩ	
	200.0V	100mV	±(0.5%rdg + 2dgt)		10MΩ	
	1,000V	1V	±(0.5%rdg + 2dgt)		10MΩ	
Alternative Current Voltage (ACV) (Auto-manu)			40 ~ 500Hz	500 ~ 1KHz		DC 1000V AC 750Vrms
	2.000V	1mV	±(1%rdg + 5dgt)		11MΩ	
	20.00V	10mV	±(0.75%rdg + 5dgt)	±(1%rdg + 5dgt)	10MΩ	
	200.0V	100mV	±(0.75%rdg + 5dgt)	±(1%rdg + 5dgt)	10MΩ	
	750V	1V	±(1%rdg + 5dgt)	±(1.2%rdg + 5dgt)	10MΩ	
DC Current (DCA)	20.00mA	10μA	±(1%rdg + 2dgt)		Burden Voltage 0.7Vmax.	Fuse & Diodes
	200.0mA	0.1mA	±(1%rdg + 2dgt)			
	10.00A	10mA	±(1.2%rdg + 2dgt)			nil
AC Current (ACA)			40 ~ 500Hz	500 ~ 1KHz	Burden Voltage 0.7Vmax.	Fuse & Diodes
	20.00mA	10μA	±(1.2%rdg + 2dgt)	±(1.5%rdg + 2dgt)		
	200.0mA	0.1mA	±(1.2%rdg + 2dgt)	±(1.5%rdg + 2dgt)		
	10.00A	10mA	±(1.5%rdg + 2dgt)	±(2%rdg + 2dgt)		nil
Resistance (Ω) (Auto-manu)	200.0Ω	0.1Ω	±(0.6%rdg + 1Ω)		open circuit Voltage <2.8V <0.64V <0.64V <0.64V <0.64V	DC 500V AC 350Vrms
	2.000KΩ	1Ω	±(0.6%rdg + 1dgt)			
	20.00KΩ	10Ω	±(0.6%rdg + 1dgt)			
	200.0KΩ	100Ω	±(0.6%rdg + 1dgt)			
	2,000KΩ	1KΩ	±(0.6%rdg + 1dgt)			
Resistance (LoΩ) (Auto-manu)	2.000KΩ	1Ω	±(0.6%rdg + 2dgt)		<0.35V	DC 500V AC 350Vrms
	20.00KΩ	10Ω	±(0.6%rdg + 2dgt)		<0.35V	
	200.0KΩ	100Ω	±(0.6%rdg + 2dgt)		<0.35V	
	2,000KΩ	1KΩ	±(0.6%rdg + 2dgt)		<0.35V	
Continuity	Ω or LoΩ		When the reading is less than 19 has a continuous 4KHz signal output at BUZ.			

V. Measurement:

5-1. DCV measurement:

(1) Plug red lead to "V, Ω, mA" jack, and balck lead to "COM" jack.

(2) Turn the rotary selector to "V" position.

(3) Connect the other ends of test leads to desired circuit.

Caution: When overload, in auto-range, it will switch to higher range; but in manual-range, it will just indicate by sound.

5-2. ACV measurement:

(1) Plug red lead to "V, Ω, mA" jack, and black lead to "COM" jack.

(2) Turn the rotary selector to "V" position.

(3) Press DC/AC, Ω/LowΩ selector once (LCD will appear ACV).

(4) Connect the other ends of test leads to desired circuit.

Caution: When overload, in auto-range, it will switch to higher range; but in manual-range, it will just indicate by sound.

5-3. DC current (20mA, 200mA, 10A) measurement:

(1) Plug red lead to "V, Ω, mA" jack (plug into "10A" jack when measure 10A), black lead to "COM" jack.

(2) Turn rotary selector to 20mA or 200mA position (turn to 10A position when measure 10A).

(3) Connect the other ends of test leads to desired circuit.

Caution: For current measurement overload will be indicated by sound only in manual-range.

5-4. AC current (20mA, 200mA, 10A) measurement:

(1) Plug red lead to "V, Ω, mA" jack (plug into "10A" jack when measure 10A), black lead to "COM" jack.

(2) Turn rotary selector to 20mA or 200mA position (turn to 10A position when measure 10A).

(3) Press DC/AC, Ω/LOWΩ selector once (LCD will appear AC mA).

(4) Connect the other ends of test leads to desired circuit.

Caution: For current measurement, overload will be indicated by sound only in manual-range.

5-5. Resistance measuement:

(1) Plug red lead to "V, Ω, mA" jack and black lead to "COM" jack.

(2) Turn rotary selector to "Ω" position.

(3) When measure circuit, cut down the power of desired circuit first, and press DC/AC, Ω/LOWΩ selector once (LCD will appear LOWΩ).

(4) Connect the other ends of test leads to desired circuit.

Caution: There is no 200Ω range for LOWΩ and AUTO measurement. The lowest range is 2KΩ. When open circuit or overload the display shall to be showed by a blinking most significant digit with the three least significant digits set to "000".

VI. Maintenance

6-1. Battery Replacement

Replace the battery when display is " ⊟ ".

(1) Turn off the power switch.

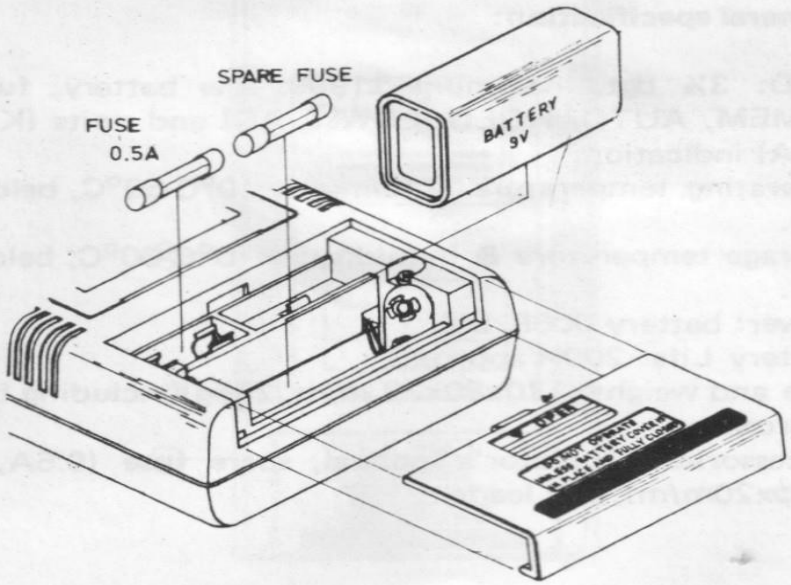
(2) Remove test leads or objects to be measured.

(3) Open the battery covers as the arrow direction.

(4) Take out the battery, carefully loose the battery and battery button.

(5) Fasten the new battery with battery button and put back to the compartment.

(6) Install the battery cover back.



6-2. Fuse check-up: select 200Ω by manual or auto, and short-cut the test leads. The LCD shows about "000" and there is a continuous sound, the fuse is good; otherwise, it has blown out, and replace a new one.

6-3. Notes:

(1) The extended resolution feature operates only on the 2000KΩ and 2000V full-scale range during auto-range operation. A blinking "1" most significant digit is interpreted as the digit 2. The three least significant digits display data normally. (Out of range input conditions are displayed by a blinking most significant digit with the three least significant digits set to "000").

(2) Do not measure or connect any voltage over DC 1000V and AC 750V.

(3) Do not take measurement before the battery cover and fuse are installed perfectly.

(4) Be sure not to input voltage or current when the function switch be set on KΩ position.

(5) Take out the battery for long time storage, and avoid under the conditions of high temperature and humidity.